**The Discovery of Penicillin**

*The greatest achievements in science have come about through hard work, determination, and plenty of luck. Successful scientists will be quick to admit that the most important of all of these is luck. That was the case with Alexander Fleming’s discovery of penicillin.*

*The famous scientist Alexander Fleming was known to say, “I have been wonderfully lucky, you know.” And it is true that luck helped him make his greatest discovery.*

**A Chance Discovery**



In 1928, Fleming worked in a laboratory in a London hospital. He was studying a certain type of bacteria, which he grew in small glass dishes. One day he came back from a vacation and was not happy with what he found. The bacteria had spoiled in many of the dishes. He began to clean the dishes in a liquid to kill the bacteria so he could reuse the dishes.

Just then, Fleming’s former lab assistant came to visit. Fleming began to complain about the extra work he had had to do since the assistant left. To show what he was talking about, he grabbed some of the dishes that were floating on the liquid. It was then that Fleming noticed a mold growing along the edge of one of the dishes. It looked something like the mold that grows on bread or cheese. That was not strange. However, the bacteria next to the patch of mold seemed to be dying. Now that was strange, and wonderful!

**What Was That Mold?**

Being a brilliant scientist, Fleming knew that his discovery was important. The mold had potential. Something in the mold was able to kill bacteria. He decided to call it penicillin after the Latin name for a group of common molds.

Fleming grew some of the mold in a sort of soup. Then he strained the soup into what he called “mold juice.” He ran many tests to find out the effect of the mold on other harmful bacteria. Surprisingly, the mold killed a large number of them. He then tested the mold juice to see if it was poisonous. It was not.

In spite of his hopeful start, Fleming ran into problems. He was not able to find out what the mold really was, how to keep it, or how to get the penicillin out of the mold juice. In 1929, he wrote a paper on his findings. However, nobody seemed very interested in it.

**Twelve Years Later**

It was not until 1940 that two scientists began to take a second look at penicillin. Howard Florey and Ernst Chain used new techniques to get the penicillin out of the mold juice. They produced the penicillin in the form of a brown powder. Then they began to test the drug on animals. They tried it on mice that had diseases caused by bacteria. To their joy, it worked. But, would it work on human beings?

Because the scientists were doing this work during World War II, they had some special problems. England was under fierce bombing attacks. Florey and Chain feared that a bomb might destroy the strain of mold from which they were getting the penicillin. They also needed a large amount of mold from which to obtain enough penicillin for a human test. Chemical firms could not help them. They were too busy working for the war effort. So, the scientists had to grow their own mold. This was quite a challenge. They used anything they could find—cookie tins, trays, dishes, and even bedpans. The work went on for eight months.

Finally, they had enough penicillin for the test. They just had to find a human subject.

**The First Human Tests**

The scientists heard about a sick policeman who was dying. No medicine so far had worked on his disease. The doctors decided to try penicillin. For five days his condition improved. However, the supply of penicillin ran out before he was completely cured. As a result, the bacteria began growing again. The man soon died.

With new faith in their efforts, the scientists stepped up their work. They soon had enough of the drug to treat four sick children. It saved the children’s lives.

With the war raging, it was important that enough penicillin be produced to treat the wounded. The scientists convinced American drug companies to get involved. Soon laboratories all over the United States were working on the drug.

**Search for a Better Strain**

Scientists searched for a better strain of the penicillin mold. So far, all the penicillin had come from the original patch that had grown on Fleming’s dish back in 1928.

Scientists based in Peoria, Illinois, had the job of finding a new mold. They asked people to send them mold from all over the world. Many moldy things were received, but none were right.

It was one lab worker’s job to buy and bring back all the moldy fruit and vegetables she could find. One day, she brought back a moldy melon. The mold they had searched for all over the world was finally found on this melon. Luck had worked its magic again!

**A Life Saver**

By 1943, penicillin was ready for use in battle. It saved the lives of thousands of American and British soldiers. And it has saved the lives of hundreds of thousands of people since then. It is no wonder that Fleming, Florey, and Chain shared the Nobel Prize for Medicine in 1944.

1. Which sentence from the passage BEST explains the photograph?
2. In spite of his hopeful start, Fleming ran into problems.
3. Being a brilliant scientist, Fleming knew that his discovery was important.
4. It was then that Fleming noticed a mold growing along the edge of one of the dishes.
5. Fleming began to complain about the extra work he had had to do since the assistant left.
6. Under which heading would you find information about the success of penicillin on animals?
7. A Chance Discovery
8. Twelve Years Later
9. The First Human Tests
10. A Life Saver
11. The author includes the italicized introduction to
12. suggest that the greatest successes happen because of hard work.
13. show why penicillin is the greatest scientific discovery of all time.
14. explain that luck was the greatest factor in the discovery of penicillin.
15. prove the Alexander Fleming was among the greatest scientists of all time.
16. The section “What Was That Mold?” was included to
17. describe how mold juice was poisonous.
18. suggest that many scientists were studying mold.
19. identify the different types of mold Fleming discovered.
20. explain how Fleming studied the effects of mold on bacteria.
21. Read this sentence from the passage.

**The famous scientist Alexander Fleming was known to say, “I have been wonderfully lucky, you know.”**

Why did the author include the quote from Alexander Fleming?

1. to prove that Fleming believed he was brilliant
2. to explain how Fleming set out to discover penicillin
3. to share how Fleming felt about his famous discovery
4. to suggest that Fleming was determined to be successful
5. Read the sentence from the passage.

**Because the scientists were doing this work during World War II, they had some special problems.**

Which word has the OPPOSITE meaning as the word *special*?

1. difficult
2. famous
3. ordinary
4. unique
5. What happened AFTER Howard Florey and Ernst Chain began producing penicillin in the form of brown powder, but BEFORE they could test it on human beings?
6. They tested the drug on diseased mice.
7. They searched for people who were dying.
8. They tried to find a chemical company to help them.
9. They began growing their own mold in cookie tins and dishes.
10. With which statement would the author MOST LIKELY agree?
11. Alexander Fleming’s discovery is still saving lives today.
12. Alexander Fleming needed to hire an assistant to help him.
13. Alexander Fleming’s work with mold was dangerous to animals.
14. Alexander Fleming was successful because he worked by himself.
15. Information about Fleming being recognized for his success with penicillin can be found under which heading?
16. Twelve Years Later
17. The First Human Tests
18. Search for a Better Strain
19. A Life Saver
20. Which word BEST describes Alexander Fleming?
21. determined
22. frustrated
23. organized
24. satisfied

Answer Key

1. Correct Answer C; DOK 3
2. Correct Answer B; DOK 1
3. Correct Answer C; DOK 2
4. Correct Answer D; DOK 2
5. Correct Answer C; DOK 3
6. Correct Answer C; DOK 1
7. Correct Answer A; DOK 2
8. Correct Answer A; DOK 3
9. Correct Answer D; DOK 2
10. Correct Answer A; DOK 3